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BOOK REVIEW

PROCEEDINGS OF THE THIRD EUROPEAN CONFERENCE ON STRUCTURAL DYNAMICS: EURODYN '96, FLORENCE, ITALY 5–8 JUNE 1996, Giuliano Augusti, Claudio Borri and Paolo Spinelli, A. A. Balkema, Rotterdam, 1996. Number of pages: 1156.

This two-volume set comprises the Proceedings of the 3rd European Conference on Structural Dynamics, held in Florence, Italy in June 1996. The Conference, first held at Bochum, Germany in 1990 and next in Trondheim, Norway in 1993, covers recent developments primarily in the European community in dynamics of structures, machinery and soil–structure systems. The 3rd Conference was organized under the umbrella of the European Association for Structural Dynamics. Papers based on five keynotes lectures cover topics of Seismic Damage Simulation: a Low Cycle Fatigue Process; Soil–Structure Interaction; Methods of Non-linear Stochastic Dynamics; Damage Detection in Vibrating Structures; and Propagation of Longitudinal Stochastic Waves. As the Conference focuses primarily on structural mechanics, only 20–25 of the 140 contributed papers published in the Proceedings are related to geotechnical engineering or geomechanics topics.

The Proceedings are divided into 12 themes: Earthquake Engineering (20 papers); Wind Engineering (17); General Dynamics and Numerical Methods (19); Non-linear Material Behaviour (6); Structural Systems and Elements (15); Bridges and Large Structures (12); Masonry and Historical Structures (5); Experimental Dynamics (9); Structural Identification and Damage Estimation (10); Soil Dynamics and Soil–Structure Interaction (13); and Vehicles and Machines (5).

Contributed papers to *Soil Dynamics and Soil–Structure Interaction* will interest readers of IJNAMG. In 'Structure of bidimensional Winkler foundation with uncertain characteristics: comparison with *in situ* observation'. F. Toublaem and P. Labbe consider soil properties governing soil–structure interaction to be stochastic variables leading to unsymmetrical rocking modes of a symmetrical building. In 'Sufficient stability criterion for unbounded soil–structure system', A. Paronesso and J. P. Wolf derive the mathematical conditions needed to guarantee numerical stability of a computational soil–sturcture model. In 'Ductility demand of simplified pile–soil-jacket system under extreme sea waves and earthquakes'. M. R. Emami Azadi and T. Moan report results of ductility demand analysis of jacketed platforms in which pile–soil foundation system is represented by a multi-stack of disks as proposed by Wolf. Ahmed Benamar, in 'Dynamic soil resistant from pile driving analysis' develops a wave propagation model to study the effect of the driving wave shape on the driveability of the pile. M. K. Berrah and M. Hadid use a boundary element method to evaluate kinematic soil–structure interaction for the case of stochastic wave propagation in 'Earthquake response of strip foundations to spatially varying ground motion'. Fu-lu Men and Jie Cui examine liquefaction in soil adjacent to a strip foundation using a non-linear, effective stress finite element model based on dynamics of two-phase soil deposit in 'Seismic liquefaction of subsoils of buildings'; simplified methods are also presented. In 'Solution of wave scattering and soil–structure interaction problems by the complementary-domain method', T. Szczesiak, B. Weber and H. Bachmann present a novel approach to solving the familiar problem of wave scattering by a geological feature such as a canyon; the dynamic stiffness matrix is found as the difference between the stiffness of a half-space with an elevation and the stiffness of a full-space. Predicting the contribution of subballast and subgrade layers to track settlements is the subject of 'Evaluation of the initial tangent moduli by seismic box tests' by J. Bencat and M. Stehlokova; moduli are based on crosshole measurements of seismic wave speeds using a dropped weight as a wave source. M. Zsohar and R. J. Scherer, in 'Determining the variation of the eigenfrequencies of layered soil with the finite difference method' present a 2-D finite difference model of a layered half-space to find soil amplification from band-limited white noise. P. Van den Broeck and G. de Roeck investigate the dynamic response of rail sleepers using a boundary element method; the influence of sleeper spacing and of bonding conditions at the contact surface are considered. In 'Dynamic soil–structure interaction

analysis of containment building including embedment and layering effects', J. S. Kim, S. H. Lee and Y. H. Rhim report favorable comparison between results obtained with CLASSI and SASSI for a range of embedments and soil parameters. Centrifuge model tests of pile driving is the subject of 'Physical simulation of the behaviour of piles during and after driving', by D. Levacher and J. G. Sieffert; the validity of scale factors for both driving and bearing capacity is discussed. The influence of accelerometer mounting conditions on measurements of soil properties by means of field-scale forced vibration tests are discussed in 'A critical appraisal of *in situ* vibration measurements' by G. Degrande, P. Van den Broeck and D. Clouteau; numerical simulation is presented which agrees with the experimental finding.

The theme *Earthquake Engineering* provides a European perspective on travelling wave effects on the seismic response of large structures. ('The effect of wave passage on the seismic response of long bridges' by O. Bayrak; 'Wave effect in the seismic response of large structures' by E. Juhasova; and 'On the correlation of amplitude and phase variation of spatially variable seismic ground motions around a common, coherent component' by A. Zerva and O. Zhang); and earthquake resistance of a buttress dam in Russia. Other topics considered within this theme include dynamic behaviour of reinforced concrete columns, bridges and frame structures; and of composite steel and concrete eccentrically braced frames.

In 'Absorbing boundaries for the transient analysis of dam–reservoir–foundation systems' by G. Fletrin and H. Bachman, a new type of absorbing boundary condition is presented; examples with finite element implementation are given. In 'Dynamic behaviour of an arch dam–foundation–reservior system: experimental and numerical study', R. C. Camara and S. B. Oliveira report favourable correlation between forced vibration testing of an arch dam in summer conditions and a finite element model.

Several papers under *Non-linear Material Behaviour* will be of interest to those researchers in rock mechanics who keep an eye on progress in the related field of computational modeling of quasi-brittle materials such as concrete. 'Modelling of concrete in high rate dynamics' by J. Sercombe, F.-J. Ulm and F. Toutlemonde describes a visco-elastic–plastic, stress–strain model over a range of strain rates; the model is proposed to account for microscopic and macroscopic sources of viscous properties of the concrete (cement paste) skeleton. An excellent review of mesh sensitivity issues associated with modeling dynamic fractures is presented in 'Mesh sensitivity of dynamic elastoplastic failure simulations' by K. Rix, T. Munz and K. Willam; results of simulating decohesive separation in Izod test specimens using a plastic strain limiter are presented. Non-specialists wishing to find a summary of issues in transient analysis of reinforced concrete structures will profit from 'Rate-dependent transient dynamic analysis of concrete structures' by J. Maca and N. Bicanic.

Although none of the papers under *Wind Engineering* pertain to geotechnical engineering, there are several papers which will appeal to non-specialists in this field. Among these, 'Nonlinear dynamic analyses of portal frames under wind action' by M. Kasperski and H. Koss considers the formation of plastic hinges in frame structures designed according to Eurocode 1, taking into account material and geometric non-linearities as well as dynamic effects. 'A simple vortex model for the aeroelastic stability of twin-deck bridge' by A. Larsen, presents a simple mathematical model for determining critical wind speed for onset of aeroelastic instability (binary flutter) of a twin deck bridge. 'Wind induced vibrations of high rise bridge towers' by F. Ricciardelli proposes a procedure for predicting the response of cable-stayed and suspension bridge towers subjected to wing loading.

Similarly, *General Dynamics and Numerical Methods* does not contain any paper relating directly to geomechanics. Non-specialists may be interested in skimming the paper entitled 'Computational characterization of attraction-basin structure in the nonlinear dynamics of multi-degree of freedom structural models' by A. Salvatori and G. Rega; this paper presents some basic ideas in the arena of dynamics of bifurcations and transitions to attractors, both quasi-periodic and chaotic. A review of 'Conservation of energy and momentum for implicit single step time integration schemes' by Detlef Kuhl and Ekkehard Ramm contains a valuable review of this topic and proposes augmentation of Newmark integration schemes with energy and momentum constraints. A discussion of finite element development and implementation is given by F. C. Filipou in 'FEDEAS: Non-linear static and dynamic analysis for evaluation of structures'.

JEREMY ISENBERG
Weidlinger Associates
New York, U.S.A.